Stem Cell Survival and Differentiation Through Chemical Genetics

Grant Award Details

Stem Cell Survival and Differentiation Through Chemical Genetics

Grant Type: SEED Grant

Grant Number: RS1-00289

Investigator:

Name:	Michael Pirrung
Institution:	University of California, Riverside
Type:	PI

Human Stem Cell Use: Embryonic Stem Cell

Award Value: $522,933

Status: Closed

Progress Reports

Reporting Period: Year 2

View Report

Reporting Period: NCE

View Report

Grant Application Details

Application Title: Stem Cell Survival and Differentiation Through Chemical Genetics

Public Abstract:

This project will test the effects of chemical compounds similar to conventional pills for their abilities to keep human embryonic stem cells growing and multiplying in the laboratory or to help them become one of the specialized types of cells, like spinal cord cells, found in the human body. Many of the substances currently used to accomplish these goals come from animals or animal cells. They carry a risk of transmitting diseases or making the human cells display some animal traits, either of which would make cells derived from human stem cells useless for transplantation and regenerative medicine. These animal-derived substances can also be very costly. Replacing these expensive materials will be essential to the eventual development of therapies for patients. These will be basic studies using one of the already-approved human embryonic stem cell lines. However, the molecules that are prepared in this work and discovered to have desirable properties should be applicable to human embryonic stem cell lines derived in the future by any technically and ethically appropriate method. The project therefore aims to discover new tools for embryonic stem cell research that will be useful to develop human therapies.

Statement of Benefit to California:

This work will be conducted in collaboration with leading California researchers in stem cell biology, in support of their goals to use human embryonic stem cells (hESCs) to derive tissues for regenerative medicine. Their goals are dependent on the eventual development of defined, non-biological media to support stem cell culture and differentiation, because such media would offer significant cost advantages and have no risk of biological contamination. The development of therapies that would significantly enhance the quality of life for Californians and the development of commercial ventures that would repay the tremendous investment the State is making in stem cell research are dependent on the achievement of the stated goals for this project.

This research will also train California undergraduate and graduate students in synthetic organic chemistry, one of the key scientific disciplines in biomedical research. Because chemists have not traditionally participated in stem cell research, most chemists working in industry are not familiar with it. However, these students will receive their disciplinary training in the context of stem cell research. California companies aiming to develop regenerative medicine using stem cells will require for their scientific staff synthetic chemists who can conduct the type of research described herein. This project will therefore help to meet the needs of California industry for a workforce with appropriate technical training.
